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Serial No.: 09/823,937  
Customer No.: 00432

**REMARKS**

The Office Action dated March 12, 2004, has been reviewed in detail and the application has been amended in the sincere effort to place the same in condition for allowance. Reconsideration of the application and allowance in its amended form are requested based on the following remarks.

Applicants retain the right to pursue broader claims under 35 U.S.C. §120.

Applicants have provided a unique solution with respect to problems regarding a METHOD OF MAKING A HOLOGEN LAMP AND OTHER ANALOGOUS LAMPS AND OBJECTS, AND APPARATUS FOR THE MANUFACTURE THEREOF. Applicants' solution is now claimed in a manner that satisfies the requirements of 35 U.S.C. §§102, 103, and 112.

**Telephonic Interview:**

The undersigned would like to sincerely thank the Examiner for the courtesies extended during a telephonic interview between the Examiner and the undersigned on July 9, 2004. During the telephonic interview, proposed Claim "A" and the claims presently on file were primarily discussed in view of the rejections in the outstanding Office

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Action. At that time, the undersigned presented several arguments in support of the claims. An agreement was not reached between the Examiner and the undersigned as to allowability of the claims. However, the Examiner indicated that he may favorably consider some of the arguments if presented in the instant Amendment.

The telephonic interview is further summarized below in the section entitled "Recordation of the Substance of the Telephonic Interview."

**New Claims:**

Claims 40-59 have been canceled herein, without prejudice, and Claims 60-79 are newly-presented herein. Claims 60-79 will be discussed herein with respect to the applied prior art and the rejections under 35 U.S.C. §112

**Rejection of Claims 41, 42, 45, 46, 49-52, and 55-58 Under 35 U.S.C. §112, First Paragraph:**

Claims 41, 42, 45, 46, 49-52, and 55-58 were rejected under 35 U.S.C. §112, first paragraph, because, according to the Examiner, the originally filed disclosure did not provide support for "minimize alkali ions on the contacted surface portion to a surface depth in the range of 150nm to 2000nm."

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This exact language has been deleted from the new claims.

However, the range of 150nm to 2000nm is recited in the new claims. Therefore, it is respectfully submitted that Figure 3 of the original disclosure supports this claimed range. Figure 3 shows a graph which charts the enrichment of sodium ions over a distance from the surface of a piece of glass to a depth of 2000nm for glass tubes blown with 21 vol.% oxygen (curve A) and for glass tubes blown essentially without oxygen (curve B). The enrichment of sodium ions is therefore shown at points from 0 to 2000nm, which includes the enrichment at a depth of 150nm. It is respectfully submitted that Figure 3 provides support for the claimed range.

In view of the above, reconsideration and withdrawal of the present rejection is respectfully requested.

**Rejection of Claims 48-59 Under 35 U.S.C. §102:**

Claims 48-59 were rejected as being clearly anticipated by Terneu et al. U.S. Patent No. 5,221,352. Claims 48-59 have been canceled herein, without prejudice, rendering the rejection against these claims moot.

Terneu discloses an apparatus for pyrolytically forming a silicon oxide coating on an upper surface of a moving, hot glass substrate.

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Terneu shows a method to make a flat glass, not a lamp bulb or other non-flat glass object. In the method of Terneu, a ribbon of glass 1 is floated along a bath of molten metal 2 to a coating station

4. At the coating station 4, coating gas is introduced to the surface of the glass 1. The coating gas contains silane, such as SiH<sub>4</sub>, nitrogen, and oxygen. A coating of SiO<sub>2</sub> is thus formed on the glass 1. Examples 1 and 2 in Terneu disclose that the SiO<sub>2</sub> layer is 90nm or 100nm thick.

In contrast to Terneu, independent Claim 60 recites a method of making a halogen lamp. It is respectfully submitted that Claim 60 distinguishes over Terneu, which only shows a method of making flat glass. Claims 61-64 are also believed to distinguish over Terneu based on their dependence from Claim 60 and their distinguishing features.

Claim 65 recites, in part:

"(c) selecting a gas having an oxygen content of one of: >0 to 20 vol.% and 22 to 100 vol.%, wherein said oxygen content is selected to decrease alkali ions, in a portion of a glass material of said finished glass object, from an exposed surface of said finished glass object to a desired depth of between 150nm to 2000nm from said exposed surface to decrease reactivity of said portion of said glass material to the desired depth from said exposed surface;"

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It is respectfully submitted that Terneu, does not teach or suggest the above limitation. It is respectfully submitted that Claim 65 distinguishes over Terneu. Claims 66-68 are also believed to distinguish over Terneu based on their dependence from Claim 65 and their distinguishing features.

Claim 69 recites, in part:

"A method of making a finished glass object, comprising one of: lamp bulbs, lamp bulbs for halogen lamps, ampoules, bottles, vials, cylinder ampoules, pharmaceutical primary packaging, containers for medical and pharmaceutical products, reagent containers, test tubes, burets, pipettes, titration cylinders, and tubular parts for chemical equipment construction, by hot forming,"

It is respectfully submitted that Claim 69 distinguishes over Terneu, which only shows a method of making flat glass. Claims 70-74 are also believed to distinguish over Terneu based on their dependence from Claim 69 and their distinguishing features.

Claim 75 recites, in part:

"(c) selecting a gas consisting of at least one member of the group consisting of: oxygen, nitrogen, inert gases, CO<sub>2</sub>, SO<sub>2</sub>, and H<sub>2</sub>O, and having an oxygen content selected to treat a portion of a glass material of said finished glass object, from an exposed surface of said finished glass object to a desired depth from said exposed surface sufficient to decrease reactivity of said portion of said glass material to the desired depth from said exposed surface;"

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Terneu does not teach or suggest such a method step, but rather teaches the use of gas that contains silane. It is respectfully submitted that Claim 75 distinguishes over Terneu, which only shows a method of making flat glass. Claims 76-79 are also believed to distinguish over Terneu based on their dependence from Claim 75 and their distinguishing features.

In view of the above, reconsideration and withdrawal of the present rejection is respectfully requested.

**Rejection of Claims 40-47 Under 35 U.S.C. §103:**

Claims 40-47 were rejected under 35 U.S.C. §103 as being unpatentable over Kononko et al. (U.S. Patent No. 3,937,623) in view of Bienvenue et al. (U.S. Patent No. 4,319,156). Claims 40-47 have been canceled herein, without prejudice rendering the rejection against these claims moot.

Kononko discloses a method for the manufacture of glass tubes. Kononko utilizes guide rolls 1 to draw a bait from a melt of molten glass. The bait initiates upward drawing of a glass tube 10, and "air is supplied inside the tube 10 being formed (along arrow A) to adjust the diameter of the glass tube (a forming air flow)" (col. 3, lines 64-66). Once stable operating conditions are attained, "a member 11

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adapted for feeding the coolant into the annealing section is introduced into the tube interior" (col. 4, lines 2-4). Kononko discloses that various gases, such as compressed air, flue gases, and water vapors, may be used as coolant to cool the hot glass and form a glass tube. Kononko discloses that "tubes with an outside diameter of 44 mm. and wall thickness of 4.0 mm." are made by the process (col. 4, lines 14-15). Kononko also discloses making tubes of 30-200 mm. (col. 4, lines 64-65). Kononko further discloses that the air-feeding member 11, which is located inside the glass tubes as they are being drawn, has an inside diameter of 14 mm., which is over 0.5 inch (col. 4, lines 21-22). Kononko does not disclose a method of making a halogen lamp.

Bienvenue discloses a vehicle headlight having a dual filament tungsten halogen lamp. The bulb or envelope 11 of Bienvenue is relatively small, measuring approximately 0.5 inch in diameter (col. 5, lines 14-15).

The Examiner stated:

"It would have been obvious to a person of ordinary skill in the art at the time the invention was made to make halogen lamps from the tubes produced by Konoko et al using the finishing steps of Bienvenue et al because the tubes produced by Konoko et al would have been expected to be used in any of

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a multitude of different undisclosed finishing processes and Bienvenue et al taught that the halogen lamp finishing steps were well known."

MPEP 2143 states:

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."

It is respectfully submitted that the combination of Kononko and Bieveneu is improper as it fails to meet the criteria required to establish a *prima facie* case of obviousness.

Regarding the second criteria, it is respectfully submitted that there is not a reasonable expectation of success of the combination. Kononko discloses a method for producing relatively large and thick tubes that would be unsuitable for use as halogen lamp bulbs. Kononko discloses tubes that are at the very least 30mm in diameter, which is approximately 1.25 inch, and can range up to 200mm, which is almost 4 inches. These types of tubes are much larger than halogen lamp bulbs, which are normally 0.25 to 0.5 inch. In addition, Kononko discloses that the air feeding tube 11 is 14mm, which is

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over 0.5 inch. It would therefore be impossible to utilize the structure of Kononko to create the 0.5 inch or smaller tube required by Bienvenue since the diameter of the air feeding tube 11 would exceed the diameter of the glass tube in which the air feeding tube 11 is supposed to fit. It is therefore unclear how the structure and process for making relatively large glass tubes of Kononko could be used to create the much smaller glass tubes used in halogen lamps as disclosed by Bienvenue, which renders the combination improper.

It is also respectfully submitted that glass making is an unpredictable art. Halogen lamps require specialized glass that is produced in very specific, and often complicated steps. A deviation in the steps would probably result in a product unsuitable for use as a halogen lamp bulb. Kononko does not disclose what type or types of glass his process could be used to make. It is therefore respectfully submitted that it could not be expected that the process of Kononko would work in producing the specialized glass of halogen lamps because there is essentially nothing disclosed in Kononko that would cause the expectation that the process of Kononko would be useful for making halogen lamp bulbs.

In view of the above, it is respectfully submitted that the second

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criteria for establishing a *prima facie* case of obviousness has not been fulfilled.

In addition, it is respectfully submitted that the first criteria relating to a suggestion or motivation to combine the references has also not been fulfilled.

As discussed above, Kononko does not disclose what type(s) of glasses can be made by his process. Bienvenue, however, discloses specific glasses that are preferable for use in halogen lamps, specifically alumino-silicate glasses and quartz, which are not disclosed by Kononko. This combination therefore amounts to a situation where it may be "obvious to try" to make the specific glass for the halogen lamp of Bienvenue by the process of Kononko, but this does not constitute a suggestion to combine these references.

In addition, the Examiner does not point out any passage in the Kononko reference which would indicate the desirability of making alumino-silicate glass tubes for use in the halogen lamp of Bienvenue. Likewise, the Examiner also does not point out any passage in the Bienvenue reference which would indicate the desirability, or the utility, of using glass tubes made by the process of Kononko. In this regard, it is important to note the decision of the Court of Appeals,

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Federal Circuit (CAFC) in its opinion in In re Howard Sernaker, 702 F. 2d 989, wherein, a Patent and Trademark Board of Appeal affirmation of an Examiner's rejection under 35 U.S.C. §103, based on a combination of references, was overturned.

In Sernaker, the invention involved related to a method for producing embroidered "emblems" which closely resembled emblems of the prior art embroidered with different colored thread. In the claims on appeal, a sculptured embroidery was produced from a single colored thread (e.g., white); a heat-transferable transfer print (e.g., a decal) was provided; the sculptured embroidery and the transfer print were mated and aligned; and color was transferred from the print to the embroidery by the application of heat.

Sculptured one-color embroideries were known in the prior art, as was the heat transferable printing process. However, the CAFC held the claims on appeal nonobvious, stating the relevant tests to be:

"(a) whether a combination of the teachings of all or any of the references would have suggested (expressly or by implication) the possibility of achieving further improvement by combining such teachings along the line of the invention in suit, and

(b) whether the claimed invention achieved more than a combination which any or all of the prior art references

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suggested, expressly or by reasonable combination."

The CAFC recognized that the separate elements of the white sculptured embroidery and the heat-transferable dyeing process existed in the prior art. However, they pointed to the absence, in the references themselves or in the prior art general knowledge as a whole, of any recognition or suggestion that further improvements could be achieved by combining these known elements in the manner taught and claimed in the application (e.g., in a mated and aligned fashion). A copy of the opinion in Sernaker is enclosed for the convenience of the Examiner.

It is believed that the decision of Sernaker is applicable in the present application, as there is nothing in either of the two references which teaches or suggests that the references be combined.

Further, since there is nothing in the applied references to teach that they be combined, it is also submitted that the only motivation to combine the applied references is the present disclosure itself, and such hindsight analysis of the available art is considered improper. At this juncture, Applicants wish to point out the decision in another court case which is considered to be relevant to the prosecution of the instant application.

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In In re Deminski, 230 USPQ 313 (1986), the CAFC overturned a decision of the Board of Patent Appeals and Interferences regarding obviousness of the invention in view of prior references. In In re Deminski, the Board upheld the Examiner's rejection of Claims 17, 18 and 21 in view of obviousness over the prior art. These claims have the limitation that the valve sets in the valve chambers be connected to permit withdrawal as a unit. The Board argued that if the Pocock reference would have attached the valve stem to the valve structure, the valve assembly would have been removable as a unit. The CAFC found nothing in the references to "suggest the desirability, and thus the obviousness" of designing the valve assembly to be removable, and stated that "the only way the board could have arrived at its conclusion was through hindsight analysis by reading into the art Deminski's own teachings. Hindsight analysis is clearly improper, since the statutory test is whether the subject matter as a whole would have been obvious at the time the invention was made." A copy of the opinion in Deminski is enclosed for the convenience of the Examiner.

In view of the above decision in In re Deminski, it is submitted that, only upon a reading of the specification of the present

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application that one would have possibly been motivated to use the glass tubes made by the process of Kononko in the halogen lamp of Bienvenue.

In view of the above, it is respectfully submitted that the first criteria for establishing a *prima facie* case of obviousness has not been fulfilled.

Finally, it is respectfully submitted that the third criteria, which states that the prior art references when combined must teach or suggest all the claim limitations, has also not been fulfilled.

Specifically, Claim 60 recites, in part:

"(c) selecting a gas having an oxygen content selected to treat a portion of a glass material of said halogen lamp from an interior surface of said halogen lamp to a desired depth from said interior surface sufficient to decrease darkening by tungsten deposition on said interior surface of said treated portion of said glass material during operation of said halogen lamp;"

It is respectfully submitted that the combined references do not teach or suggest this method step.

Claim 65 recites, in part:

"(c) selecting a gas having an oxygen content of one of: >0 to 20 vol.% and 22 to 100 vol.%, wherein said oxygen content is selected to decrease alkali ions, in a portion of a glass material of said finished glass object, from an exposed surface of said finished glass object to a desired depth of between 150nm to 2000nm from said exposed surface to

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decrease reactivity of said portion of said glass material to the desired depth from said exposed surface;"

It is respectfully submitted that the combined references do not teach or suggest this method step.

Claim 69 recites, in part:

"(c) selecting a gas having an oxygen content selected to decrease alkali ions, in a portion of a glass material of said finished glass object, from an exposed surface of said finished glass object to a desired depth from said exposed surface sufficient to decrease reactivity of said portion of said glass material to the desired depth from said exposed surface;"

It is respectfully submitted that the combined references do not teach or suggest this method step.

Claim 75 recites, in part:

"(c) selecting a gas consisting of at least one member of the group consisting of: oxygen, nitrogen, inert gases, CO<sub>2</sub>, SO<sub>2</sub>, and H<sub>2</sub>O, and having an oxygen content selected to treat a portion of a glass material of said finished glass object, from an exposed surface of said finished glass object to a desired depth from said exposed surface sufficient to decrease reactivity of said portion of said glass material to the desired depth from said exposed surface;"

It is respectfully submitted that the combined references do not teach or suggest this method step.

In view of the above, it is respectfully submitted that the third

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criteria for establishing a *prima facie* case of obviousness has not been fulfilled.

It is respectfully submitted that Claims 60, 65, 69, and 75, distinguish over and are not rendered obvious by the applied references, either taken singly or in any reasonable combination thereof, and therefore are believed to be allowable. Claims 61-64, 66-68, 70-74, and 76-79 are also believed to be allowable over the applied references based on their dependence from Claims 60, 65, 69, and 75, respectively, and their distinguishing features.

In view of the above, reconsideration and withdrawal of the present rejection are respectfully requested.

**Rejection of Claims 48-59 Under 35 U.S.C. §112, Second**

**Paragraph:**

Claims 48-59 were rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. These claims have been canceled herein, without prejudice. New Claims 60-79 are believed to overcome the present rejection.

**Recordation of the Substance of the Telephonic Interview:**

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In order to render this Amendment complete, the following is a recordation of the substance of the telephonic interview conducted with the Examiner on July 9, 2004:

- 1) No exhibits were shown, nor were any demonstrations conducted.
- 2) Primarily, proposed Claim "A" and the claims on file were discussed.
- 3) Primarily, the prior art discussed was Terneu et al., Kononko et al., and Bienvenue et al.
- 4) Generally, Applicant's representative submitted, *inter alia*, that the prior art discussed did not teach nor suggest the claimed method.
- 5) Generally no other pertinent matters were discussed.
- 6) No agreement was reached as a result of the interview.

**Art Made of Record:**

The prior art made of record and not applied has been carefully reviewed, and it is submitted that it does not, either taken singly or in any reasonable combination with the other prior art of record, defeat the patentability of the present invention or render the present invention obvious. Further, Applicants are in agreement with the

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Examiner that the prior art made of record and not applied does not appear to be material to the patentability of the claims currently pending in this application.

In view of the above, it is respectfully submitted that this application is in condition for allowance, and early action towards that end is respectfully requested.

**Summary and Conclusion:**

It is submitted that Applicants have provided a new and unique METHOD OF MAKING A HALOGEN LAMP AND OTHER ANALOGOUS LAMPS AND OBJECTS, AND APPARATUS FOR THE MANUFACTURE THEREOF. It is submitted that the claims are fully distinguishable from the prior art. Therefore, it is requested that a Notice of Allowance be issued at an early date.

If mailed, I, the person signing this certification below, hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date indicated in the certification of mailing on the transmittal letter sent herewith, or if facsimile transmitted, I, the person signing this certification below, hereby

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certify that this paper is being facsimile transmitted to the United States Patent and Trademark Office on the date indicated in the certification of facsimile transmission on the transmittal letter which is being facsimile transmitted herewith.

Respectfully submitted,



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Court of Appeals, Federal Circuit

In re Deminski

No. 85-2267

Decided July 8, 1986

## PATENTS

## 1. Patentability — In general (§51.01)

References of compressors and pumps are within field of inventor's endeavor of horizontally reciprocating, double acting piston devices for moving fluids.

## 2. Invention — Specific cases — Mechanical (§51.5095)

Claims containing limitation that valve sets in each valve chamber be connected in manner permitting them to be withdrawn as unit were improperly rejected, as there is nothing in prior art references to suggest desirability and thus obviousness of designing valve assembly so that it can be removed as unit.

Appeal from Patent and Trademark Office, Board of Patent Appeals and Interferences.

Application for patent of Richard M. Deminski, application Serial No. 177,863, for a High Pressure Gas Transmission Compressor. From affirmance of examiner's rejection of claims 1-3, 6, 7, 17, 18, and 21, applicant appeals. Affirmed in part and reversed in part.

David E. Schmit and Frost & Jacobs, both of Cincinnati, Ohio (Timothy J. O'Hearn, on the brief) for appellant.

John C. Martin, Associate Solicitor (Joseph F. Nakamura, Solicitor and Fred E. McKelvey, Deputy Solicitor) for Patent and Trademark Office.

Before Baldwin, Smith, and Newman, Circuit Judges.

Smith, Circuit Judge.

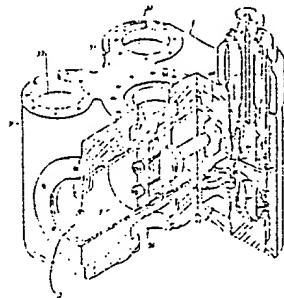
This is an appeal by Richard M. Deminski (Deminski) from the February 25, 1985, decision of the Patent and Trademark Office Board of Patent Appeals and Interferences (board), in which the board affirmed the examiner's final rejection, under 35 U.S.C. § 103, of certain claims in Deminski's utility patent application, serial No. 177,863, relating to a high pressure gas transmission compressor. We affirm in part and reverse in part.

The issue is whether the board erred in affirming the examiner's rejection of claims 1-3, 6, 7, 17, 18, and 21 of the Deminski patent application, under 35 U.S.C. § 103, as unpatentable over the prior art. We affirm the rejection of claims 1-3, 6, and 7. We reverse the rejection of claims 17, 18, and 21.

*Deminski's Invention*

Deminski's invention "relates generally to double-acting high pressure gas transmission compressors," such as those used "for transmitting natural gas and other compressible fluids through pipe lines." More particularly, the invention is directed to a horizontally reciprocating, double-acting piston type gas compressor in which the valves can be removed easily for replacement.

The embodiment of Deminski's invention (Fig. 1) includes a block-like compressor housing (2) with a horizontal cylinder (3) which extends longitudinally through the housing and a double-acting piston (9) carrying piston rings (14). There are four openings (30) in the cylinder, with passageways (38) to four vertically disposed cylindrical valve chambers (32), which chambers are located at the four corners of the compressor housing (2). A suction valve (50), a discharge valve (40), and a baffle between the valves form a valve assembly which may be withdrawn as a unit from valve chamber (32).

*Claims on Appeal*

Claims 1, 3, 6, 7, 17, 18, and 21 were rejected under 35 U.S.C. § 103 as unpatentable over Pocock U.S. Patent No. 1,226,693 in view of British Patent No. 1,332,774 and Shallenberg U.S. Patent No. 1,976,464. Briefly, the examiner and the board stated that it would have been obvious in view of the British

reference to add two more valve chambers to Pocock, and in view of Shallenberg to move the cylinder upwardly so that it is above the bottom of the valve chambers.

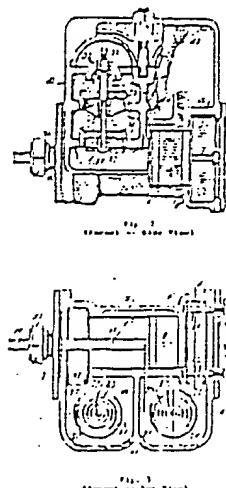
Claim 2 was rejected under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British reference and Shallenberg, and further in view of Kovach which teaches the use of a piston ring in a double-acting piston pump.

*Prior Art Relied Upon by the Board*

*A. Pocock.*

Pocock's U.S. Patent No. 1,226,693 teaches a double-acting piston pump. The pump is typically small and is used to pump water out of underground mines.

A significant feature of Pocock is that the valve stem (27) (Figs. 2, 3) is easily removable because it is not rigidly connected to the valves or the valve seats. After the valve stem is removed, the valve pieces can be removed either by turning the pump upside down or by withdrawing the pieces one at a time with tools or by hand.



Pocock shows two valve housings (14) located along the same side of the pump cylinder. The valve housings are vertically oriented, so that the valves can be removed vertically through the top of the housing. The Pocock structure does not allow for removal of the valve assembly as a unit.

*B. British Patent.*

The British Patent No. 1,332,774 is directed to a double-acting piston compressor with a horizontal cylinder (2), such as a high capacity piston compressor for use with gas pipelines (Fig. 4). The British patent shows four hori-

zontal valve chambers. Two of the valve chambers are located above the cylinder and two of the chambers are located below the cylinder. Each valve chamber is perpendicular to the cylinder.

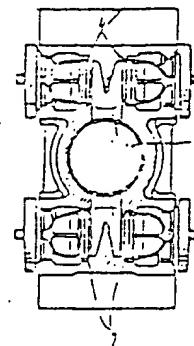


Fig. 4  
(British Patent)

*C. Shallenberg.*

Shallenberg, U.S. Patent No. 1,976,464, teaches a double-acting piston pump with a particular valve construction. The structure includes two distinct and separate valve chambers situated above the cylinder (Fig. 5). Each valve chamber contains two valves of the same type (i.e., either two suction valves or two discharge valves). The disclosure indicates that two of the four valves could be placed below the cylinder and two above the cylinder but that the inventor believes it preferable to arrange them all above the cylinder because "that enables more ready installation and removal of the valves."

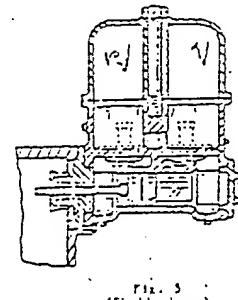


Fig. 5  
(Shallenberg)

*D. Kovach.*

Kovach, U.S. Patent No. 1,946,166, discloses a particular valve construction for a reciprocating piston air pump. The only feature relied on by the examiner and by the board is that the piston is provided with piston rings as a seal.

## Obviousness

## A. Prior Art and Ordinary Skill in the Art.

[1] Deminski argues that the references applied by the examiner and by the board "are not properly contained within the scope of the [relevant] prior art," i.e., they are "nonanalogous." Deminski contends that none of the references should be considered as prior art because none is directed to the problem of removing worn or damaged valves from compressors. In Deminski's view, the examiner and the board defined the problem too broadly by including both compressors and pumps in the prior art.

Deminski cites *Stratoflex, Inc. v. Aeroquip Corp.*, in which this court stated that "[t]he scope of the prior art has been defined as that 'reasonably pertinent to the particular problem with which the inventor was involved.'" The question in *Stratoflex* was whether rubber hose should be considered as prior art relevant to the claimed PTFE tubing. In finding that rubber hose was prior art, the court focused on only the second step of the two-step test for nonanalogous art which test had been stated in *Wood* in the following terms:

The determination that a reference is from a nonanalogous art is therefore two-fold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.

Here, the references satisfy the first inquiry because they are "within the field of the inventor's endeavor" of horizontally reciprocating, double-acting piston devices for moving fluids. We agree with the board that the cited pumps and compressors have essentially the same function and structure: they move fluids by means of a double-acting piston, a cylinder, and valves.<sup>1</sup> Consequently, the field of endeavor is the same for an inventor of either a pump or a compressor of the double-acting

piston type.<sup>2</sup> Thus, the Pocock "pump" was correctly considered as prior art for the Deminski "compressor." It is even more clear that the British and Kovach references are within Deminski's field of endeavor because they are directed to compressors having horizontally reciprocating, double-acting pistons.

## B. Whether Deminski's Invention Would Have Been Obvious.

We affirm the board's decision insofar as it affirms the examiner's rejection of claims 1, 3, 6, and 7 under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British Patent No. 1,322,774 and Shallenberg. The examiner and the board correctly found that it would have been obvious in view of the British reference to add two more valve chambers to Pocock and in view of Shallenberg to move the cylinder upwardly so that it is above the bottom of the valve chambers.

We also affirm the rejection of claim 2 under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British reference, Shallenberg, and further in view of Kovach, which teaches the use of a piston ring in a double-acting piston pump.

[2] We reverse the board's decision insofar as it affirms the examiner's rejection of claims 17, 18, and 21. The latter claims have the limitation that the valve sets in each valve chamber be connected in a way which will permit them to be withdrawn as a unit. There is nothing in the prior art references, either singly or in combination, "to suggest the desirability, and thus the obviousness," of designing the valve assembly so that it can be removed as a unit.<sup>3</sup>

Simply put, Deminski solved the problem of how to remove the valve assembly by designing a compressor with four vertically oriented valve chambers. Each chamber contains a valve assembly which can be removed as a unit through the opening at the top of the valve chamber. Each of the four valve assembly units may be removed relatively easily by lifting vertically with a hoist.

<sup>1</sup> *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed. Cir. 1983) (quoting in turn from *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979)).

<sup>2</sup> *Wood*, 599 F.2d at 1036, 202 USPQ at 174.

<sup>3</sup> See *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973) (cross-reference in official search notes is some evidence of analogy, although "the similarities and differences in structure and function of the inventions disclosed in the references \*\*\* carry far greater weight"). The nearly identical classifications of the application and references in the present case are the result of the close similarity in structure and function of the invention and the prior art.

Deminski argues at length that the scope of his claims is limited by the language "a high-pressure gas transmission compressor." We need not decide whether the preamble is limiting in this case because the prior art would be the same for either pumps or compressors of the double-acting piston type. We acknowledge, however, that the prior art did not address Deminski's problem of how to remove a large and heavy valve assembly as a unit.

<sup>4</sup> *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1556, 223 USPQ 26, 31 (Fed. Cir. 1985) (quoting *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984)) (emphasis added in *Fromson*).

Pocock teaches a pump in which only the valve stem is separately removable and replaceable. The Pocock structure requires the valve pieces to be removed item-by-item, by turning the pump upside down, by using a tool, or by hand. Because the Pocock structure is typically small, Pocock does not address Deminski's problem of how to remove a large and heavy valve assembly as a unit. Instead, Pocock teaches away from the invention of claims 17, 18, and 21 of Deminski's patent application.

There was no suggestion in the prior art to provide Deminski with the motivation to design the valve assembly so that it would be removable as a unit. The board argues that if Pocock had followed the "common practice" of attaching the valve stem to the valve structure, then the valve assembly would be removable as a unit. The only way the board could have arrived at its conclusion was through hindsight analysis by reading into the art Deminski's own teachings. Hindsight analysis is clearly improper, since the statutory test is whether "the subject matter as a whole would have been obvious at the time the invention was made."

#### *Conclusion*

We affirm the board's decision insofar as it affirmed the examiner's rejection of claims 1-3, 6, and 7 in Deminski's patent application. We reverse the board's decision insofar as it affirmed the examiner's rejection of claims 17, 18, and 21 as unpatentable over the prior art under 35 U.S.C. § 103.

*AFFIRMED IN PART, REVERSED IN PART*

Court of Appeals, Federal Circuit

In re Sernaker

No. 82-579

Decided Feb. 28, 1983

PATENTS

1. Claims — Dependent (§20.35)

Dependent claims, patentability of which were not argued separately, stand or fall with independent claims.

2. Patentability — Anticipation — Combining references (§51.905)

Assuming that all prior art references are sufficiently related to one another and to related and common art that hypothetical person skilled in art must be presumed to be familiar with all of them, next questions as to whether Board of Appeals correctly deduced obviousness from prior art are whether combination of teachings of all or any of references would have suggested, expressly or by implication, possibility of achieving further improvement by combining such teachings along line of invention in suit, and whether claimed invention achieved more than combination that any or all of prior art references

suggested, expressly or by reasonable implication.

3. Court of Appeals for the Federal Circuit — Pleading and practice (§26.57)

CCPA cases reviewing decisions of Board of Appeals under Section 103 are binding precedents in CAFC, as much as CAFC's cases will be; none can be treated as discredited merely because expressions in them can be taken out of their context and construed as in conflict with expressions in other cases.

4. Patentability — Anticipation — Modifying references (§51.217)

Patentability — Evidence of — Suggestions of prior art (§51.469)

It is not necessary that prior art suggest expressly or in so many words changes or possible improvements inventor made; it is only necessary that he apply knowledge clearly present in prior art.

5. Patentability — Anticipation — Combining references (§51.905)

Lesson of *In re Imperator*, 179 USPQ 730, is that prior art references in combination do not make invention obvious unless something in prior art references would suggest advan-

stage to be derived from combining their teachings.

**6. Patentability — Evidence of — In general (§51.451)**

Secondary considerations that Supreme Court stated might be of possible utility in obviousness determination, *Graham v. John Deere Co.*, 148 USPQ 466-7, require nonobviousness finding if matter is otherwise doubtful.

**7. Board of Appeals — Issues determined (§19.30)**

**Patentability — Evidence of — In general (§51.451)**

Board of Appeals must always consider, in connection with obviousness determination, evidence relating to secondary considerations that applicant properly presented.

**8. Patentability — Evidence of — Commercial success — Causes (§51.4555)**

Fact that prior art references relied on had not been available to inventor very long and things were moving fast in that industry might justify thought that want filled by invention had not been felt very long, but it does not wholly justify ignoring secondary considerations that speak with unusual eloquence.

**9. Affidavits — Distinguishing from references (§12.7)**

Patent Rule 116(b) allows examiner to admit affidavit that attests to uniqueness of invention after his final action upon showing of good cause.

**10. Affidavits — In general (§12.1)**

**Board of Appeals — Procedure and practice (§19.45)**

**Pleading and practice in Patent Office — Rules effect (§54.9)**

Under Patent Rule 195, Board of Appeals has power to admit affidavit attesting that invention has met with great commercial success, helped revitalize depressed industry, and introduced new item into marketplace not previously presented upon showing of good cause.

**11. Patentability — Evidence of — Commercial success — In general (§51.4551)**

Notion that Board of Appeals' bare compliment of appellants' device as "extremely attractive" implies assignment of weight to appellants' commercial success evidence is rejected, since to accept this notion would shrink meaning of phrase "secondary considerations" beyond belief.

**Particular patents — Emblem Sernaker, Embroidered Transfer and Method of Making, rejection of claims reversed.**

**Appeal from Patent and Trademark Office: Board of Appeals.**

Application for patent of Howard Sernaker, Serial No. 916,018, filed June 15, 1978. From decision rejecting claims 1-6 and 8-11, applicant appeals. Reversed; Davis, Circuit Judge, concurring in part and concurring in the result, with opinion.

Michael F. Petock, Philadelphia, Pa., for appellant.

Fred W. Sherling (Joseph F. Nakamura, on the brief) for Patent and Trademark Office.

Before Davis, Circuit Judge, Cowen, Senior Circuit Judge, and Nichols, Circuit Judge.

Nichols, Circuit Judge.

This case is before us on appeal from the decision of the Patent and Trademark Office Board of Appeals (board). In a 2-1 decision, the board affirmed the examiner's rejection, under 35 U.S.C. § 103, of claims 1-6 and 8-11 in appellant's application serial No. 916,018, filed June 15, 1978, entitled "Embroidered Transfer and Method of Making." These claims comprise all the claims in the case. We reverse.

I.

*Background*

*A. The Invention*

Appellant has invented a type of embroidered emblem and a method of making the same. Claims 1 and 10, the only independent claims in appellant's application, are representative of the method and of the emblem, respectively:

1. A method of making an embroidered transfer or emblem comprising the steps of:

(a) embroidering a pattern on a portion of a substrate while using thread free from oil and with said thread being of a single color and in an amount so that a portion of the pattern is sculptured by having a greater thickness than another portion of the pattern;

(b) separating the pattern and its associated substrate portion from the remainder of the substrate,

(c) providing a transfer print on paper with a dyestuff of at least two different colors and capable of subliming under heat and pressure or vacuum,

(d) registering portions of the print with mating portion of said pattern,

(e) transferring color from said print as a gas to the warp side of the pattern while applying sufficient heat to sublime said dyestuff.

10. An embroidered transfer emblem comprising an embroidered pattern on one side of a substrate whose size corresponds to the size of the pattern with thread of a single color which is free of needle oil, portions of the pattern having a sculptured effect by an increased number of thread stitches, at least two colors of dyestuff printed on the thread stitches defining said portions and on other portions of the pattern, said colors being in registry with said sculptured portions of said pattern with at least one of said printed portions including printing outlining a configuration on a portion of said pattern, and said colors being printed on the warp side of said pattern.

[1] The remaining claims are either dependent on method claim 1 (claim 2-6) or on article claim 10 (claims 8, 9 and 11). For example, claim 2 defines a method in accordance with claim 1 of "applying a thermoplastic adhesive to the shuttle side of the thusly printed pattern." Since neither of the parties argues separately the patentability of each of the rejected claims, the dependent claims will stand or fall with independent claims 1 and 10. *In re Burckel*, 592 F.2d 1175, 1178-79, 201 USPQ 67, 70 (CCPA 1979).

The claim language includes several key phrases that we should define at the outset. When the inventor uses "registering" and "in registry," he appears by the context to mean placing or placed in correspondence. A "substrate" literally means a basis on which an organism lives, as a plant on the soil. Another common definition of the term in scientific circles is any solid surface on which a coating or layer of different material is deposited. Under both definitions, application to an embroidery is an understandable analogy.

The record includes samples of the "emblems" made by the claimed method, as completed, and in intermediate stages. As completed, the "emblems" are justly characterized by the board as "extremely attractive." They are apparently badges affixed to garments to convey messages about the loyalties, affiliations, tastes, and preferences of the wearer. Would that we judges had something of the sort to brighten up our robes!

The emblem produced by appellant's method resembles an emblem initially embroidered with different colored threads. Appellant's method, however, circumvents the need to embroider the desired pattern with these different colored threads. Rather, a manufacturer following appellant's method first embroiders the pattern with thread of one color on a substrate, separates the embroidery and its associated substrate from the rest of the substrate, and then essentially dyes the threads different colors by use of a transfer print. Such a transfer print consists of two or more dyestuffs on a piece of paper arranged in a pattern mirroring in shape or "mating" the pattern of the embroidery. By placing the transfer print over the embroidery so that the dyestuffs face the embroidery and match its pattern, and then by applying heat and pressure or vacuum conditions, the dyestuffs on the paper will sublime and then adhere to the matching portion of the embroidery.

Before appellant's invention, a manufacturer would use the Shiffli embroidery machine alone to mass produce embroidery. This large machine, however, cannot stitch thread of more than one color at a time. Thus, to create multicolored patterns, the machine would be shut down after each separate color had been embroidered so its 684 needles could be rethreaded with the next color thread. Since each rethreading procedure takes about 45 minutes, the number of different colors that were commercially feasible to use in a single emblem was limited. With appellant's invented method, on the other hand, a manufacturer can produce an emblem of many colors because he needs not rethread the machine anew for each desired color. Instead, only one color (usually white) is used for the entire embroidered pattern, and then the pattern is dyed different colors with one multicolored transfer print.

#### B. The References

The references relied upon by the board are:

Haigh	3,657,060	April 18, 1972
Cox	3,974,010	August 10, 1976
Sernaker	4,092,451	May 30, 1978
British patent	1,243,223	August 18, 1971

Miles, L.W.C., *Journal of the Society of Dyers and Colorists*, May 1977, pages 161-163.

Veliins, *British Knitting Industry*, Vol. 46, No. 524, January 1973, pages 45, 46, 48, 50, 53, 55, 57, 59, 63, 65, 67, and 69.

The Butterick Fabric Handbook, Published by Butterick Publishing, A Division

of American Can Company, New York, New York, 1975, pages 99, 100, 119-121, and 142.

The British patent discloses a process of transfer printing on all types of textile articles regardless of their fibers, and a like process of printing on a variety of non-textile articles. With respect to transfer printing on textile articles, the British patent recites a general line of materials to which the process may be applied:

" \* [F]leeces or webs of non-woven fibers, textile threads, woven webs, knitted material, lace, spongy material in sheet form or already shaped, or even made up articles of clothing.

[British, page 1, lines 68-72.]

The British patent does not specifically mention embroidery as an article susceptible to transfer printing. This patent does, however, teach that a multicolored design may be transferred to textile articles, generally, from a transfer print:

" \* [S]everal dyes of different colours can be applied on the same support [of the transfer print], these dyes being either intimately mixed or distributed in order to form the designs which are to be transferred to the textile articles.

[British, page 2, lines 44-48, emphasis supplied.]

The Miles reference teaches that transfer printing can be done on a variety of substrates, such as substrates of polyester and of carpet tile. Miles specifically states that when transferring designs from a paper transfer print to fiber, perfect contact is not necessary because of the vapor state of the dye when it transfers. Although Miles exhibits an awareness of embroidery procedures, he does so in the context of describing the transfer of embroidered patterns onto nonembroidered surfaces; Miles does not teach transfer printing on embroidery itself. Vellins not only teaches transfer printing on a variety of textile substrates (including carpet), but also teaches the deleterious effects of transfer printing on a polyester substrate that contains lubricating oil and other such substances.

The remainder of the references concern various embroidery techniques and methods of producing embroidered emblems, rather than teachings about transfer printing. Butterick reveals that white-on-white embroidery, such as embroidery decoration on a white tablecloth, is commonly made. Butterick also teaches that designs formed in lace can be outlined with embroidery stitching; Butterick defines this entire piece of lace as "re-embroidered lace."

The Haigh patent discloses an embroidered emblem comprised of an embroidered design

stitched onto a woven fabric backing material with an embroidered border, and a thermoplastic adhesive bonded to the other side of the backing material.

The Cox patent discloses a method of preparing articles of "aetized" embroidery whereby a design is embroidered directly onto a backing of thermoplastic material, the design and backing are ironed onto a transfer strip, and then the transfer strip is removed taking with it all parts of the backing not in contact with the embroidery. Embroidery is "aetized" when heat is used to remove the portions of a backing not in contact with embroidery stitches, so that the embroidered design is left hanging together like lace. The portions of the thermoplastic backing that remain in contact with the embroidery become absorbed or melted into the embroidery as a result of the ironing and serve to improve the bonding of the embroidery stitches and to give the embroidery more body. This improved bonding eliminates the need for underlay and interlock stitches, which would otherwise provide such additional bonding.

The Sernaker patent, issued to appellant in this case, discloses an embroidered transfer wherein a pattern is embroidered onto one side of a diaphanous material with the Schiffli machine, and a layer of adhesive is applied to the other side of this material. When this transfer is ironed onto a base fabric, the diaphanous material melts into the fabric and disappears from view; the transfer thus assumes the appearance of a pattern that is directly embroidered onto the base fabric.

### C. The Rejection

The board affirmed the examiner's rejection of claims 1, 4-6, and 9-11<sup>1</sup> under 35 U.S.C. § 103 as obvious in view of British taken with Miles, Vellins, and Butterick. The board also affirmed the rejection of claims 2, 3, and 8 for the same reasons and further in view of Cox or Haigh and Sernaker. The board took the position that appellant's invention in essence consisted of two known elements or procedures: (1) the transfer printing of multi-colored designs from a paper strip onto various types of substrates, including

<sup>1</sup> In Part II, 4 of the examiner's final rejection dated December 3, 1979, the examiner rejected appellant's claims 1-6, and 8-11. In the portion of this letter articulating the reasons for the rejection (Pl. II, 12), however, the examiner inadvertently omitted claim 11 from his discussion of the group of claims to which it belonged. The omission was a typographical error. The board corrected this error when it discussed the examiner's rejection of claims 1, 4-6, and 9-11.

fabrics, and (2) the making of embroidered transfers or emblems by stitching a pattern of different colored threads onto a substrate.

After noting that appellant had admitted that both of these elements were known in the prior art, the board characterized the manner in which appellant combined them to make a novel article in the following way: "A substrate is stitched with a single colored or white thread and then dyed in the form of a design by transfer printing." Transcript at 75. In the subsequent analysis of the cited references, the board treated various aspects of the appellant's claims as either taught by the references concerning transfer printing or those concerning emblem-making. The board thus reduced the appeal to the question "whether it would have been obvious for one skilled in this art, having these references available, to use the dye transfer process for coloring embroidered emblems." Transcript at 75. The board answered affirmatively, stating:

After reviewing the references, we come to the conclusion that the dye transfer process has been taught to be usable for almost any type of substrate, from relatively smooth fabrics to materials, such as carpets, which are rough in texture and even to aluminum substrates. The formation of embroidered fabrics is known and, as is taught by Butterick, white-on-white embroidery is commonly made. We believe that one skilled in this art would readily understand that the dye transfer process, as described in these references, and which is acknowledged to be old by appellant, may be used to transfer dye in the form of a pattern to any substrate, whether smooth or rough.

While we find the embroidered emblems extremely attractive, we believe that the process would have been obvious in view of the cited art and that only the expected additive results are obtained. Also, we must not lose sight of the fact that the claims are generic in nature and are not limited to the specific exhibits presented in this case. We must compare the claims with the methods and articles described in the references. When we do so, we come to the conclusion that the claimed process and resulting article would have been obvious to one skilled in this art.

[Transcript at 75-76.]

## II.

### Opinion

#### A. Whether the board correctly deduced obviousness from the prior art.

[2] We may assume, for purposes of this decision, that all the prior art references in this case are sufficiently related to one another and to a related and common art, that the hypothetical person skilled in the art must be presumed to be familiar with all of them. That being so, the next questions are (a) whether a combination of the teachings of all or any of the references would have suggested (expressly or by implication) the possibility of achieving further improvement by combining such teachings along the line of the invention in suit, and (b) whether the claimed invention achieved more than a combination which any or all of the prior art references suggested, expressly or by reasonable implication. These manifestly related tests are indicated as appropriate by the following decisions of the former Court of Customs and Patent Appeals reviewing, as we do here, decisions of the board denying patentability under § 103 on obviousness grounds.

Cases reversing the board and holding the invention patentable —

In re Rinehart, 531 F.2d. 1048, 189 USPQ 143 (CCPA 1976).

In re Imperato, 486 F.2d 585, 179 USPQ 730 (CCPA 1973).

In re Adams, 356 F.2d 998, 148 USPQ 742 (CCPA 1966).

[3] Cases affirming the board and holding the invention unpatentable for obviousness —

In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In re Conrad, 439 F.2d 201, 169 USPQ 170 (CCPA 1971).

In re Scheckler, 438 F.2d 999, 168 USPQ 716 (CCPA 1971).

And there are many others. All these cases are binding precedents in this tribunal, as much as our own will be. *South Corp. v. United States*, 690 F.2d 1368, 215 USPQ 657 (Fed. Cir. 1982). None can be treated as discredited merely because expressions in them can be taken out of their context and construed as in conflict with expressions in other cases. Some minds will prefer the results of the first trio, others of the second. The tests stated above, (a) and (b), were the tests applied in all six cases.

The board majority misdescribed the invention by confusing the embroidery with the substrate and in supposing the inventor just applied a print to a rough substrate instead of a smooth one. It compared the invention with the prior art on the basis of the elements employed being print and substrate. Actually, by both claim 1 and claim 10, there are three component elements. The embroidery is introduced between the print and the substrate. It is all

applied to the embroidery. The pattern, being "sculptured," intercepts the colors in the print according to the designer's intentions. The print and the pattern (embroidery) are made to "register" (claim 1 and 10 both use this word), i.e., conform. They "mate."

Certainly the board pointed to no prior art that separately suggested expressly or by implication a three-element combination made up in this way. British in general teaches transfer prints on the substrate, as do Miles and Vellins. The remainder do not teach at all about transfer printing. When one skilled in the art at the time of the invention is considering all the prior art in combination, we wholly fail to perceive what more he would have found. The most that would have appeared to have been suggested was the use of transfer prints on rough substrates by which, no doubt, a variety of designs might have been achieved. Mating or registering are suggested nowhere in the prior art. Therefore, it does not show how to approach the results this inventor achieved. No prior art suggests expressly or by implication keeping the print off the substrate and providing a "sculptured" embroidery in a pattern to mate and register with the print.

Although British teaches transfer printing on lace, this patent does not envision the use of a pattern inserted between the transfer print and the lace substrate that would "mate" with the transfer print. Of course the lace substrate itself has an inherent pattern, but British makes no mention of it and does not even hint at mating the transfer print with this pattern. Without some express or implied suggestion, we cannot assume that one of ordinary skill in the art would have found it obvious to mate the transfer print with this pattern. More to the point, the inherent pattern in lace cannot be inserted between the lace substrate and the transfer print because the pattern is part and parcel of the substrate. Even though lace can be "re-embroidered," as Butterick teaches, the embroidery on re-embroidered lace does not initiate a pattern, but merely outlines the pattern of the lace itself; the single colored embroidery described in the first steps of appellant's claimed method, on the other hand, exhibits a pattern of its own designed to mate with the transfer print, and keeps the print off the substrate.

The conclusion is the same under test (b) as it is under test (a). Under test (b), the person who considered merely combining the teachings of prior art references would not expect from the references or any implication to be drawn therefrom that the great advance made by appellant's invention could be at-

tained. The board never showed how the teachings of the prior art could be combined to make the invention.

In re Scheckler, *supra*, may be taken as an example of a case where a combination of the teachings of prior art references suggested the inventor's result. The invention was for a building block for wall construction comprising a sandwich whose exterior portion were slabs of solid concrete and the interior, bonded to the slabs, was rigid light cellular heat insulating organic foam material. One prior art reference disclosed a reinforced concrete beam with an inner core of foamed polymeric material. Another disclosed a building block consisting of two layers of load-bearing glass separated by an interior layer of heat-insulating foamed glass material.

[4] It could not have placed any great strain on the intellect of the court to sustain the board's conclusion of obviousness. The court said, and we agree, it was not necessary that the prior art suggest expressly or in so many words, the "changes or possible improvements" the inventor made. It was only necessary that he apply "*knowledge clearly present in the prior art.*" Scheckler, 438 F.2d at 1001, 168 USPQ at 717. (Emphasis supplied.)

If this last test is not met, the invention claimed would not have been obvious from the references.

[5] In re Imperato, *supra*, may be taken as an example of a case when combination of the teachings of prior art references did not suggest the inventor's result. The court therefore reversed the board's holding of obviousness. The invention related to an improvement in the process of "beneficiating" low grade ore to prepare it for the blast furnace. Beneficiation requires grinding the ore to a finely divided state in order to facilitate the removal of impurities. Then, however, it must be recombined into lumps for the furnace. The prior art used various carbonates for bonding to which the inventor added free sulphur. Other prior art taught use of free sulphur only for bonding. The board thought it obvious to combine the two. The court, however, noted that combining both carbonates and sulphur achieved an unexpected result. Both prior processes resulted in lump ore having high strength at low temperatures, but not at high temperatures, whereas the combination obtained a lump ore having high strength in both situations, an unexpected and unobvious result. The lesson of this case appears to be that prior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantage to be derived from combining their teachings. It does not appear from

the opinion that the inventor actually did anything not disclosed somewhere in the prior art references, and in that regard the case was less favorable for unobviousness than the case at bar, where none of the prior art references disclosed an embroidery inserted between the print and the substrate, "registered" or mated the print with the embroidery, not the substrate, and transferred the print to the insert, not to the substrate.

For the foregoing reasons, it is clear that the principal rejection of claims 1, 4-6, and 9-11 cannot be sustained. The four references relied upon by the board for this rejection (British, Miles, Vellins, and Butterick), either separately or in combination, do not suggest that transfer printing techniques should be combined with embroidery techniques in the specific manner claimed in appellant's application. In view of all the art of record, we also hold that the secondary rejection of claims 2, 3, and 8 must be reversed. While Cox, Haigh, and Sernaker disclose various aspects about the making of embroidered emblems, none of them disclose or suggest transfer printing; they do not envision using transfer printing to create the effect of embroidery with different colored threads. Rather, they suggest using standard embroidery techniques, such as hand looming or embroidery with the Schiffli machine alone, to create the embroidered pattern. In the absence of any suggestion to use teachings concerning transfer printing in the making of embroidered emblems, we conclude that appellant's claimed invention would not have been obvious to one of ordinary skill in the art from the above seven references at the time of the invention.

*B. Whether the board correctly disregarded the secondary considerations.*

[6,7] Finally, we hold that the "secondary considerations" that the Supreme Court stated might be of possible utility in an obviousness determination, *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 466-467 (1966), also require a finding of nonobviousness if the matter be otherwise doubtful. In an appeal of a rejection of a patent application, secondary considerations, such as commercial success, typically do not play a large part in the analysis of obviousness because the inventor usually waits until his patent issues before he swings production into full gear. Thus, a detailed analysis of secondary considerations is more common in cases like *John Deere*, which involved infringement. If, however, a patent applicant properly presents evidence relating to these secondary considerations, the board must al-

ways consider such evidence in connection with the determination of obviousness. *In re Fielder and Underwood*, 471 F.2d 640, 644, 176 USPQ 300, 303 (CCPA 1973).

[8] Appellant presented a considerable amount of such evidence. Despite the fact that a patent has not yet issued, appellant has been able to license his invention. Appellant's licensees have sold millions of the emblems, and the Gilardone affidavit attests that appellant's invention has met with great commercial success, has helped revitalize a depressed embroidery industry, and has introduced a new kind of emblem into the marketplace. The DeVries affidavit also attests to the uniqueness of appellant's invention. In addition, the record clearly shows that appellant's multicolored, embroidered emblems are considerably cheaper to produce than the prior art embroidered emblems. It is true the prior art references relied on to establish obviousness had not been available to the inventor very long. Things apparently were moving fast in that industry. This might justify the thought that the want filled by the invention had not been felt very long, but it does not justify wholly ignoring these secondary considerations which here speak with unusual eloquence.

[9,10] In the face of all this evidence, the board was silent. Although the two affidavits in the record before us were submitted after the examiner's decision became final, they were submitted before the board reached its decision. While appellant presented the DeVries affidavit to the examiner after his final action, 37 C.F.R. §1.116(b) (1982) would allow the examiner to admit this evidence upon a showing of good cause. Under 37 C.F.R. §1.195 (1982), the board had the power to admit the later Gilardone affidavit upon a similar showing. The record before us, however, is unclear whether the examiner did, in fact, admit the DeVries affidavit, and whether the board admitted the Gilardone affidavit; neither the examiner nor the board mentioned these affidavits. In response to our specific question in oral argument, however, the solicitor admitted that the "commercial success" affidavits were before the board. In addition, the solicitor cited in his brief the telling Gilardone affidavit and assured us that the board did consider evidence of commercial success. He stated:

The argument (Br-15), that the Board of Appeals failed to consider the evidence of commercial success, is untenable. The Board specifically stated that they found the embroidered emblems "extremely attractive" (R-76). This appears to be a recognition that the emblems would be well-received commercially. Appellant's af-

affidavit (R-64) [the Gilardone affidavit] shows only that the emblems have had good sales. There is no comparison with the sales of other embroidered emblems.

[11] As we stated above, the Gilardone affidavit shows much more than "good sales." In addition, we reject the notion that the board's bare compliment of the emblems as "extremely attractive" implies assignment of weight to appellant's commercial success evidence. To accept this notion would shrink the meaning of the phrase "secondary considerations" beyond belief. The board in fact said nothing about the commercial success of appellant's invention, and nothing about any of the other considerations the Supreme Court deemed relevant. Although the solicitor assures us that the board did consider the evidence before us relating to secondary considerations, we do not agree with his analysis of this evidence, nor do we find any support for this analysis in the board's opinion.

The solicitor in effect has stipulated that the board considered the evidence, which necessarily implies that it allowed the filing of it on a showing of good cause, as to which there is no other evidence in the record. In view of this stipulation, it appears it would be inappropriate to remand the case for the board to consider the same evidence a second time. We can only conclude that for some unexplained and, to us, unfathomable reason, the board found it insufficient to overcome the, to it, plain indications of obviousness.

For the reasons stated in this opinion, the decision of the board is *reversed*.

*Reversed.*

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Davis, Circuit Judge, concurring in part and concurring in the result.

I join in Parts I and II B of Judge Nichols' opinion. As for Part II A, my judicial microscope suggests to me that, if the prior art is considered alone, the case is much closer than his opinion indicates. Differences there are, of course, between appellant's invention and the prior art, but it is not plain to me, from the bare references alone (especially those disclosing or suggesting transfer printing on lace and other rough-textured or somewhat "sculptured" material), that the invention was not obvious from the prior art. I need not, however, decide that unclear question on the references alone. For me the crucial insight is the "secondary consideration" of commercial success which (as Part II B of the main opinion spells out) appellant has fully proved, the Solicitor has not sought to rebut and has admitted was before the Board, and the Board failed properly to consider. Under

Graham v. John Deere Co., 383 U.S. 1, 17-18, 148 USPQ 459, 466-467 (1966), that type of success is a relevant factor, and in this close case I think it decisive in showing nonobviousness.